MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2018/2019

PBM0054 – MATHEMATICS

(Foundation in Business)

15 MARCH 2019
9.00 a.m. – 11.00 a.m.
(2 Hours)

INSTRUCTIONS TO STUDENT

1. This question paper consists of 3 pages with **FIVE** questions.

2. Attempt **ALL** five questions. The distribution of the marks for each question is given.

3. Please write all your answers in the answer booklet provided. All necessary workings **MUST** be shown.

QUESTION 1

a Subtract the rational expression $\frac{x+2}{x^2-10x+25}-\frac{x-4}{3x-15}$. (4 marks)

b. Perform the indicated operations and simplify the expression.

$(5x-2y)^2-(2x+5y)^2+2x[5-3(y+2)]$ (4 marks)

c. Rationalize the denominator for $\frac{x^2-y^2}{\sqrt{x}-\sqrt{y}}$. (3 marks)

d. Determine the domain of the following function:

$$f(x)=\frac{x^2+1}{45-9x-20x^2+4x^3}$$ (4 marks)

e. Find the equation of the line that is perpendicular to the line $-\frac{5}{3}y+4x-6=0$ and passing through the point $(2,6)$. (4 marks)

f. At a large beach resort, the weekly supply and demand equations for the folding beach chairs are

$p=\frac{x}{6}+9$ (Supply equation)

$p=\frac{24840}{x}$ (Demand equation)

i. How many units are required for supply to equal demand? (4 marks)

ii. At what price will supply equal demand? (2 marks)

(Total = 25 marks)

Continued...

QUESTION 2

a. Solve the equations.

i. $2^{x^2} = 8^{2x} \cdot \frac{1}{256}$ (3 marks)

ii. $\log_3(x-1) + \log_3 2x = \log_3(3x+1)$ (4 marks)

b. Use the substitution $u = 2^x$ to solve the equation $4\left(2^x + \frac{1}{2^x}\right) = 17$. (5 marks)

(Total = 12 marks)

QUESTION 3

Solve the following system of linear equations using the inverse of coefficient matrix.

$$\begin{aligned} 3x + 2y + 4z &= 19 \\ 2x - y + z &= 3 \\ 6x + 7y - z &= 17 \end{aligned}$$ (13 marks)

(Total = 13 marks)

QUESTION 4

a. Differentiate the following functions with respect to x. Simplify the answers.

i. $y = \sqrt[5]{x}\left(\frac{1}{x} + x^{\frac{1}{2}}\right)(1-3x)$ (5 marks)

ii. $y = \frac{(x^2-1)^4}{1+2x}$ (5 marks)

b. If $f(x) = (2x-7)^2(3x+2)^3$, find $f'(-2)$. (4 marks)

c. Find the equation of the tangent line to the curve $y = x^3\sqrt{8-2x}$ at the point $x = 2$. (6 marks)

d. Given that $f(x) = px^2 + qx$. If $f(3) = -4$ and $f'(2) = 3$. Find the values of p and q. (5 marks)

(Total = 25 marks)

Continued...

QUESTION 5

a. Integrate each of the following integral.

i. $\int_1^4 \left(3x^2 - 6\sqrt{x} - \frac{4}{\sqrt{x}}\right) dx$ (4 marks)

ii. $\int \left(\frac{10\sqrt[3]{x^2} - 4\sqrt{x} + 6x^3 - 2x^{\frac{5}{2}} + 30x^2}{5x^2}\right) dx$ (5 marks)

iii. $\int_{\frac{1}{2}}^{1} \frac{8(x^2+2)}{\sqrt{(x^3+6x+3)}}\, dx$ (6 marks)

iv. $\int x(x+6)^8\, dx$ (6 marks)

b. Find a suitable value of k if $\int_2^5 (x^2 - kx + 1)\, dx = \frac{27}{2}$. (4 marks)

(Total = 25 marks)

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